

VMS Upgrade and Installation Supplement: VAXstation 3520, 3540

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This document supplements the current version of the *VMS Upgrade and Installation Manual* with information specific to VAXstation 3520, 3540 computers. This information includes startup, shutdown, and backup procedures.

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Preface

The *VMS Upgrade and Installation Supplement: VAXstation 3520, 3540* contains installation and upgrade information specific to VAXstation 3520, 3540 computers. Use this information in conjunction with the *VMS Upgrade and Installation Manual*.

Important: When you are ready to upgrade, install, or update the VMS operating system, use the supplied documentation as follows:

- 1 Read all release-specific cover letters (if any) included with your distribution kit.
- 2 Read the most current version of the *VMS Release Notes*.
- 3 Consult the current version of *VMS Upgrade and Installation Manual* — it is your *primary* source of step-by-step upgrade and installation procedures.
- 4 Refer to this supplement for computer-specific information when the *VMS Upgrade and Installation Manual* directs you to do so.
- 5 Store the hard copy of this supplement and the *VMS Upgrade and Installation Manual* in the binder that contains the *VMS Release Notes*.

This guide refers to the VAXstation 3520 and VAXstation 3540 computers by their abbreviated names, the VAXstation 3520, 3540 computers.

Intended Audience

This *VMS Upgrade and Installation Supplement: VAXstation 3520, 3540* is intended for anyone responsible for installing or upgrading the VMS operating system on VAXstation 3520, 3540 computers.

Document Structure

This manual is organized as follows:

- Chapter 1 describes the hardware you use when installing or upgrading the VMS operating system.
- Chapter 2 describes some tasks you need to perform when you install the VMS operating system. The *VMS Upgrade and Installation Manual* refers to this chapter for installation tasks that are specific to VAXstation 3520, 3540 computers.
- Chapter 3 contains instructions for starting up and shutting down the system.
- Chapter 4 describes backup procedures that you must perform after an installation or upgrade and on a regular basis.

Preface

- The Glossary defines terms used in the *VMS Upgrade and Installation Supplement: VAXstation 3520, 3540*.

Associated Documents

You must have and be familiar with the following documents:

- The *VMS Upgrade and Installation Manual*, which is your *primary* source of upgrade and installation information. Use the *VMS Upgrade and Installation Manual* in conjunction with the *VMS Upgrade and Installation Supplement: VAXstation 3520, 3540* when you are performing an installation or upgrade.
- The *VMS Release Notes* which provides important information on various aspects of the VMS operating system. Read the *VMS Release Notes* before installing, upgrading, or updating the VMS operating system.
- Hardware manuals that are supplied with your VAX computer. These manuals contain detailed information on your system hardware.

Conventions

The following conventions are used in this manual:

Ctrl/x

A sequence such as Ctrl/x indicates that you must hold down the key labeled Ctrl while you press another key or a pointing device button.

.

A vertical ellipsis indicates the omission of items from a code example or command format; the items are omitted because they are not important to the topic being discussed.

red ink

Red ink indicates information that you must enter from the keyboard or a screen object that you must choose or click on.

For online versions of the book, user input is shown in **bold**.

boldface text

Boldface text represents the introduction of a new term or the name of an argument, an attribute, or a reason.

Boldface text is also used to show user input in online versions of the book.

italic text

Italic text represents information that can vary in system messages (for example, Internal error *number*).

UPPERCASE TEXT

Uppercase letters indicate that you must enter a command (for example, enter OPEN/READ), or they indicate the name of a routine, the name of a file, the name of a file protection code, or the abbreviation for a system privilege.

numbers

Unless otherwise noted, all numbers in the text are assumed to be decimal. Nondecimal radices—binary, octal, or hexadecimal—are explicitly indicated.

1. The first part of the paper is devoted to a general discussion of the problem of the existence of a solution of the system of equations (1) and (2) under the assumption that the functions $f_i(x)$ and $g_j(x)$ are continuous and satisfy the conditions

(1)

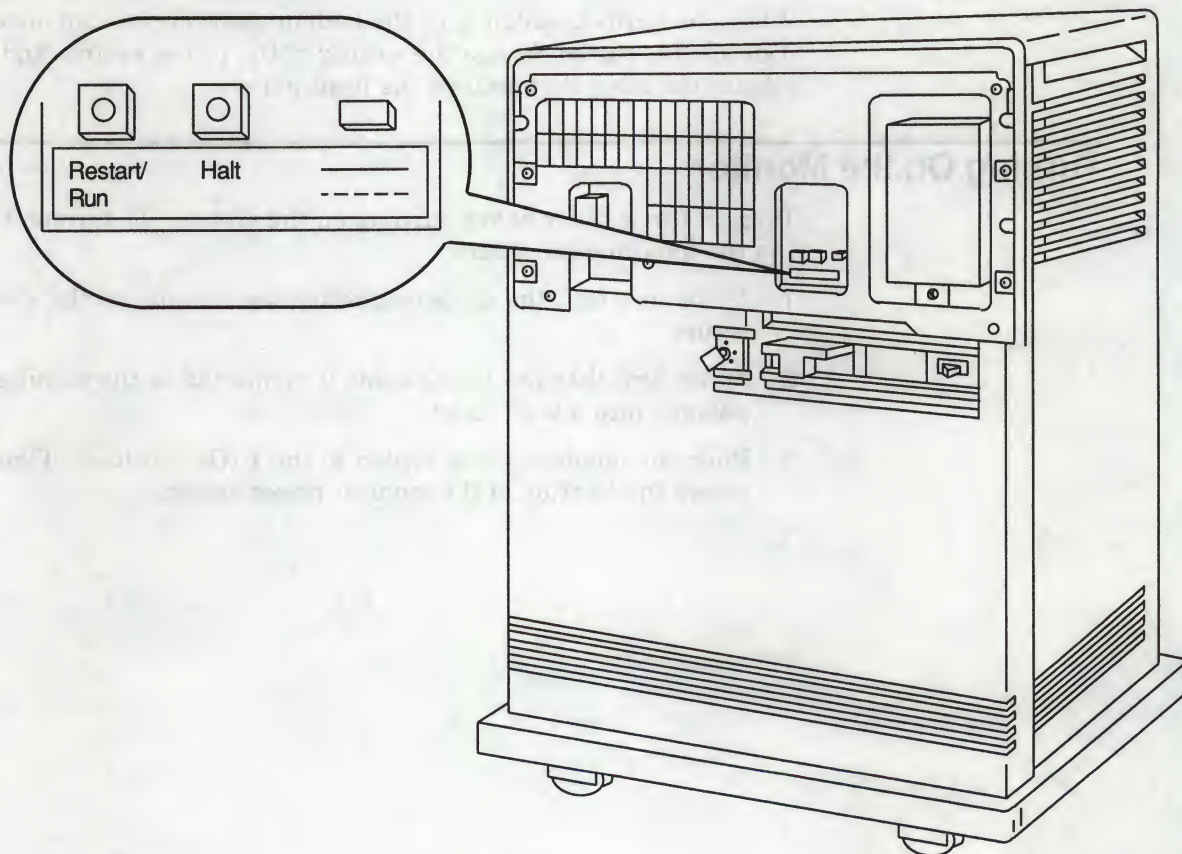
1 Hardware

This chapter describes the hardware you use to install the VMS operating system and perform system management operations. For a complete description of the VAXstation 3520, 3540 hardware, see the hardware manuals. The hardware manuals include information on hardware installation, operation, troubleshooting, and technical information.

1.1 Controls and Indicators

All controls and indicator lights on the VAXstation 3520, 3540 computers are located on the front of the system. Figure 1-1 shows the control panel and Table 1-1 describes the various controls and lights.

Figure 1-1 Control Panel



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Hardware

1.1 Controls and Indicators

Table 1-1 Controls and Indicator Lights on the Control Panel

Control/Indicator Light	Description
Power switch	Turns on (or off) the AC power. This rocker switch is labeled 1/0 (on/off). It has an orange light that glows when power to the system is on.
Power supply light	Glowes green when the system is running.
Halt button	Stops the system. When you push the Halt button in, it glows red and the system enters console mode.
Restart/Run button	Restarts a running system. Pressing this button has no effect if the system is stopped.

A three-position keylock switch controls the position of the plastic panel door. When the keylock switch is in the top position, you can see the controls and indicator lights, but you cannot touch them.

When the keylock switch is in the middle position, you can open the panel door part way to use the tape cartridge drive and operate the write-protect switches for the fixed disk drives.

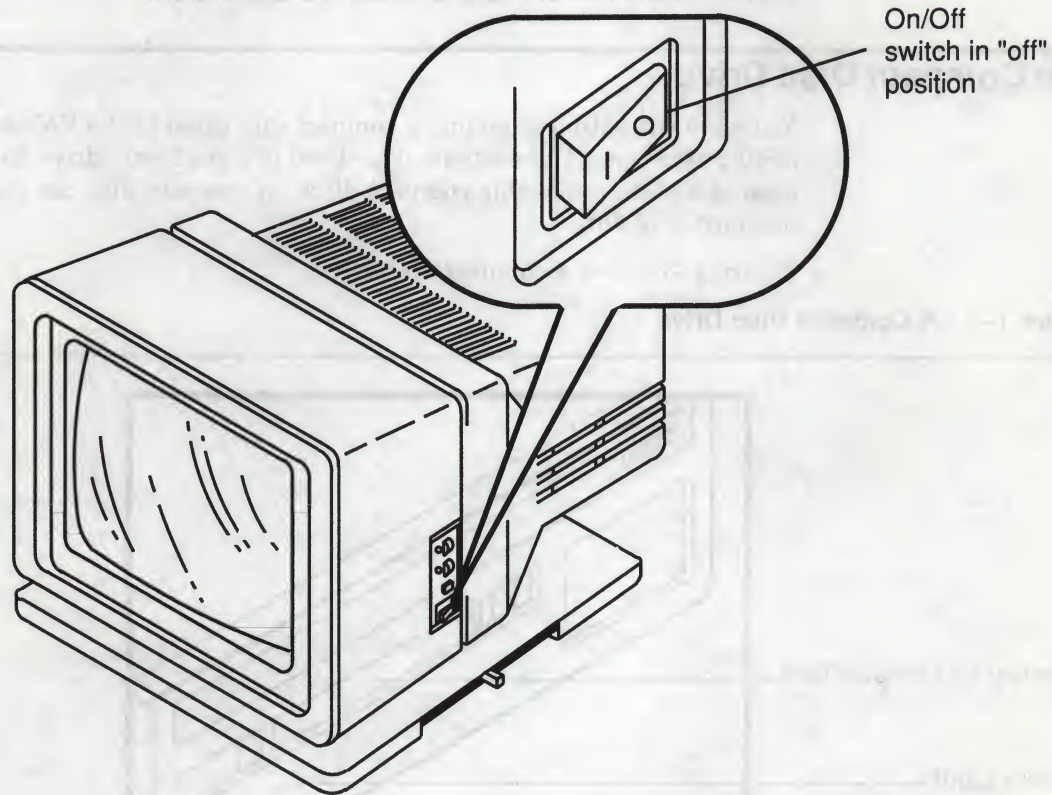
When the keylock switch is in the bottom position, you can open the panel door all the way to change the setting of the power switch, and you can release the latch that secures the front panel.

1.2 Turning On the Monitor

Turn on the monitor before turning on the system. To turn on the monitor, use the following procedure:

- 1 Make sure that the cable connecting the monitor to the system is secure.
- 2 Make sure that the power cable is connected to the monitor and plugged into a wall outlet.
- 3 Push the monitor power switch to the 1 (On) position. Figure 1-2 shows the location of the monitor power switch.

Figure 1-2 Monitor Power Switch



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1.3 Turning On the System

Before turning on the system, check the following:

- Make sure that the system is plugged in properly and that all power cable, monitor cable, and other cable connections are secure.
- Make sure that the monitor is turned on.

To turn on the system, push the power switch to the 1 (On) position. The switch glows orange. The fans inside the system box go on.

The system performs diagnostic tests. During these self-tests, the system begins a countdown sequence. The numbers in the sequence depend on the hardware installed in the system and the devices attached to it.

The first time a VAXstation 3520, 3540 computer is turned on, it will display the language-mode selection menu. If you are prompted to select a language, select the one you want to use by entering the number associated with that language and pressing the Return key.

Note: If you wait for more than half a minute before choosing a language, your system automatically selects American English.

Hardware

1.3 Turning On the System

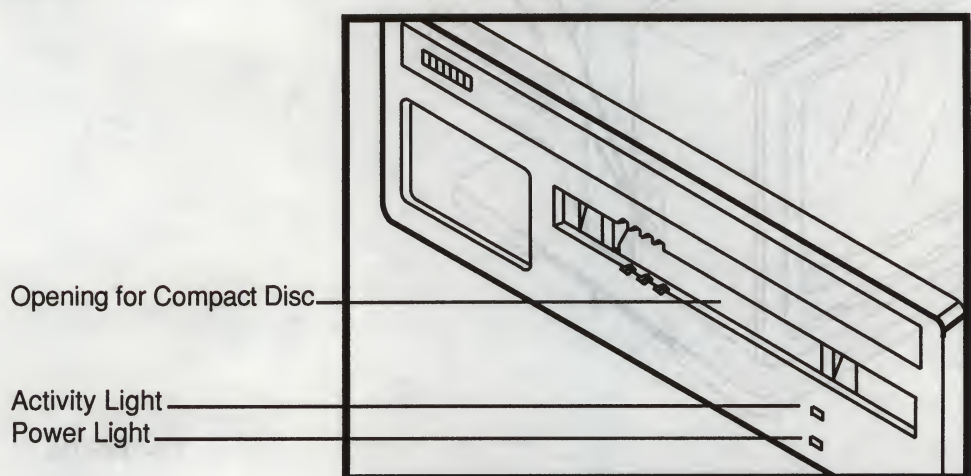
When the sequence completes, the console-mode prompt (`>>>`) should appear on the terminal screen. If the console-mode prompt (`>>>`) does not appear on the monitor screen, press the Halt button.

1.4 The Compact Disc Drive

You have the option of adding a compact disc drive to the VAXstation 3520, 3540 computers. The compact disc drive is a read-only drive that reads data stored on removable compact discs. A compact disc can store 600 megabytes of data.

Figure 1-3 shows a compact disc drive.

Figure 1-3 A Compact Disc Drive



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There are two lights on the front of the compact disc drive. They are described in Table 1-2.

Table 1-2 Lights on the Compact Disc Drive

Light	Description
Drive activity light	Glow green when there is a compact disc in the drive. It flashes when the drive is active.
Power supply light	Glow green when the power to the compact disc drive is on.

1.4.1 Restrictions on the Use of the Compact Disc Drive

When you enter the `SHOW SCSI` command at the console-mode prompt (`>>>`), the display might not include information on the compact disc drive you have in an expansion box. If this happens, check the cable from the system box to the drive. Also make sure the power to the drive is

1.4 The Compact Disc Drive

turned on. If the problem still persists, turn the power to the drive off and then on again. Wait 10 seconds or more before trying the SHOW SCSI command again. At this time the compact disc drive should be included in the display.

If you want to boot standalone BACKUP from the compact disc drive, make sure the compact disc is in the drive *before* you enter the BOOT command. If you try to boot standalone BACKUP while there is no compact disc in the drive, the following error message will be displayed:

DKA400 Device type not recognized

1.4.2 Inserting a Compact Disc

A compact disc is contained within a clear plastic *caddy*. When you insert a compact disc into the drive, insert the entire caddy. DO NOT remove the disc from the caddy.

To insert a compact disc into the drive, do the following:

- 1 Make sure the power to the drive is on. The power supply light (the lower light) on the front of the drive should be lit.
- 2 Examine the caddy. Make sure it is not cracked or damaged in any way.
- 3 Examine the disc inside the caddy. One side of the disc is labeled. The label should always be facing up as you insert the disc into the drive. When the label is facing up, the four notches on the caddy are on the left as shown in Figure 1-4. These notches line up with four similar notches on the front of the drive.
- 4 Insert the caddy as shown in Figure 1-4. Make sure the notches on the left side of the disc caddy line up with the notches on the door of the drive. Slide the caddy in as far as it will go and then remove it. When you remove it, notice that the disc remains in the drive. Only the clear plastic caddy comes out.
- 5 The drive activity light (the upper light) should go on within five seconds.

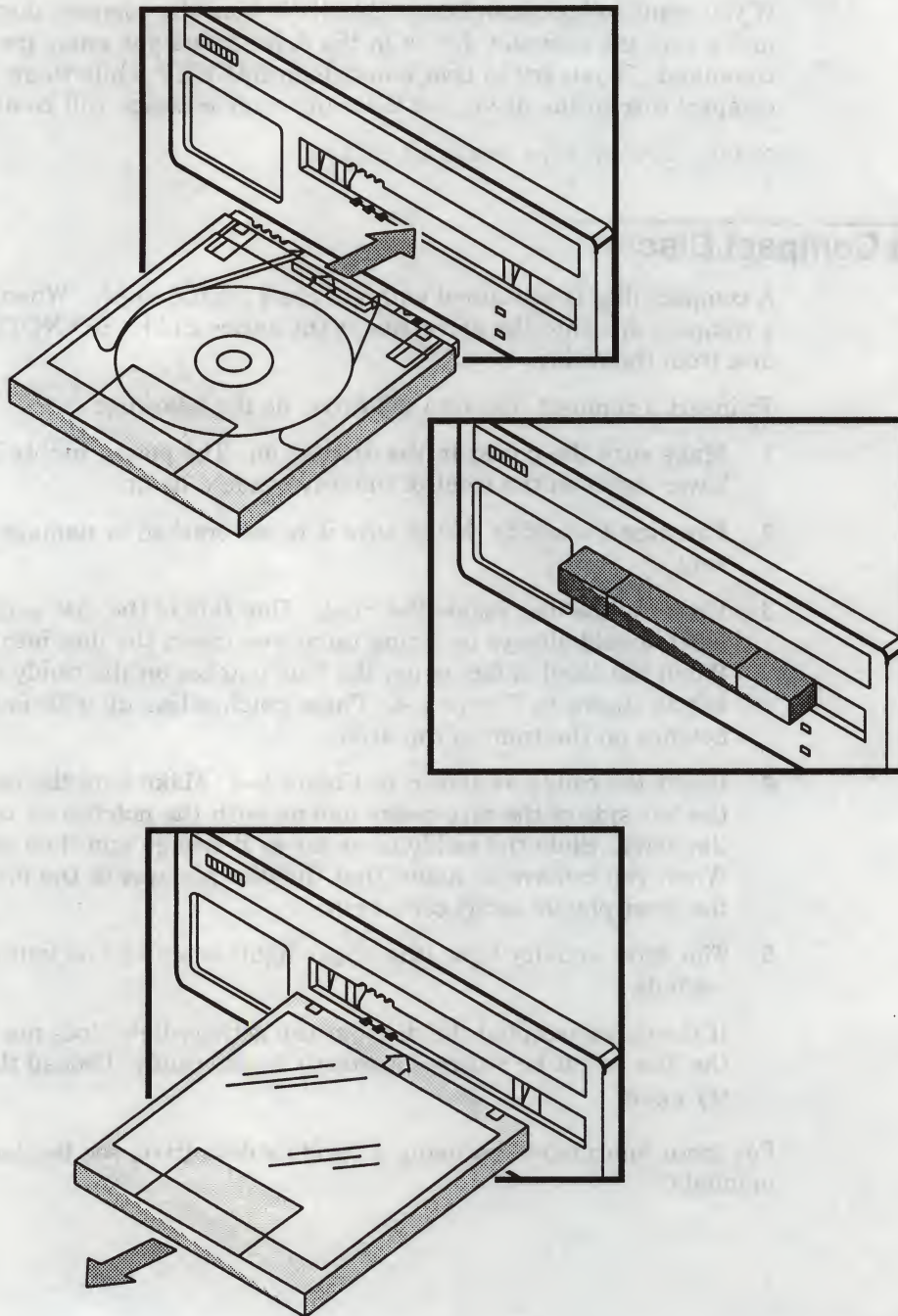
If the drive accepted the disc but the activity light does not light, then the disc might be sitting incorrectly in the caddy. Unload the disc and try again.

For more information on using a compact disc drive, see the hardware manuals.

Hardware

1.4 The Compact Disc Drive

Figure 1-4 Inserting a Compact Disc



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1.4.3 Removing a Compact Disc

Before removing a compact disc, make sure the activity light is not flashing. If it is flashing, wait for it to stop before you proceed.

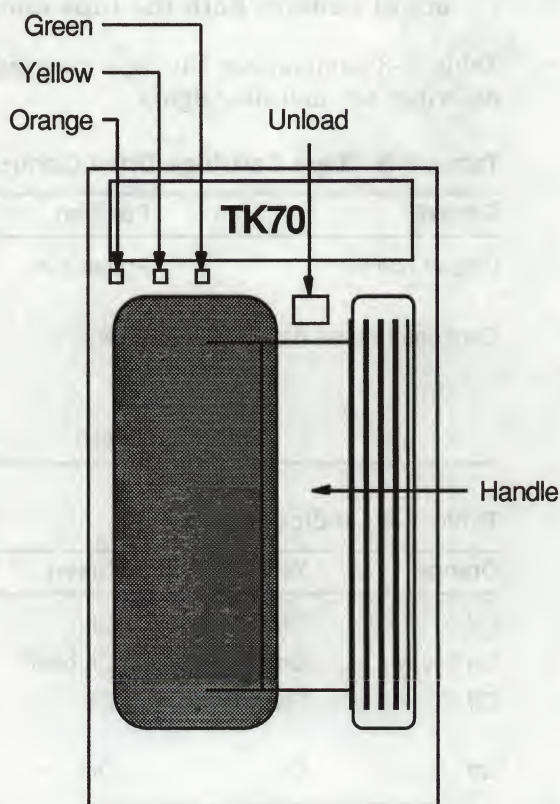
To remove a compact disc from a drive, do the following:

- 1 Position the clear plastic caddy by matching the four notches on the disc to the four notches on the drive. Make sure the caddy is going into the drive arrow-first.
- 2 Insert the caddy into the drive door as far as it will go.
- 3 Remove the caddy. The disc will be back in the caddy. The activity light will go out.

1.5 The Tape Cartridge Drive

This section briefly describes the tape cartridge drive. Figure 1-5 shows a tape cartridge drive.

Figure 1-5 A Tape Cartridge Drive



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Hardware

1.5 The Tape Cartridge Drive

The device name of this tape drive is MUA0. When using the tape cartridge drive shown in Figure 1-5, you should be aware of the following:

- The orange light glows when the tape cartridge is write-protected.
- The yellow light glows when the tape is loaded.
- The green light glows when the tape is unloaded.

Caution: To prevent damage to the tape or the drive, never remove a tape cartridge when any of the following are true:

- The green light is off.
- The orange light is on.
- The yellow light is on.

- You use the Unload button to rewind and unload the tape.
- The cartridge release handle is located next to the tape access slot. This handle controls the position of the tape drive spindle. Pull the handle open to insert or remove a tape cartridge.

Caution: Pull the cartridge release handle open only when the green light glows steadily and the yellow light is off. Otherwise you might damage both the tape and the drive.

Table 1-3 summarizes the tape cartridge drive controls. Table 1-4 describes the indicator lights.

Table 1-3 Tape Cartridge Drive Controls

Control	Position	Function
Unload button	Pressed in	Rewinds and loads the tape (15 seconds to 3 1/2 minutes).
Cartridge release handle	Open	Lets you insert or remove a tape after rewind and unload operations are completed.
	Closed	Locks tape in operating position.

Table 1-4 Indicator Lights

Orange	Yellow	Green	Condition
Off	Off	Off	No power to the tape drive.
On briefly	On briefly	On briefly	Power to the tape drive.
Off	Flashes	Off	The tape is moving or the tape drive is initializing the tape.
Off	Off	On	Drive beeps. It is safe to move the handle and insert or remove a tape.

(continued on next page)

1.5 The Tape Cartridge Drive

Table 1-4 (Cont.) Indicator Lights

Orange	Yellow	Green	Condition
Off	On	Off	Tape loaded successfully.
Off	Off	Flashes	The cartridge leader may be defective. Pull open the handle and remove the cartridge from the drive. Do not use the cartridge.
Flashes	Flashes	Flashes	A fault is occurring. Press the unload button. The orange, yellow, and green lights glow briefly and the drive reinitializes. If the problem persists, do not attempt to remove the tape cartridge. Call Digital Customer Services.

1.6 Using a Tape Cartridge

Follow these guidelines when using tape cartridges:

- Tape cartridges come in clear plastic protective cases. You should keep the tape cartridges in these cases when you are not using them.
- The label slot holds the label that provides information about the contents of the tape cartridge. Label a tape cartridge before you copy files to it (distribution tape cartridges are labeled already).

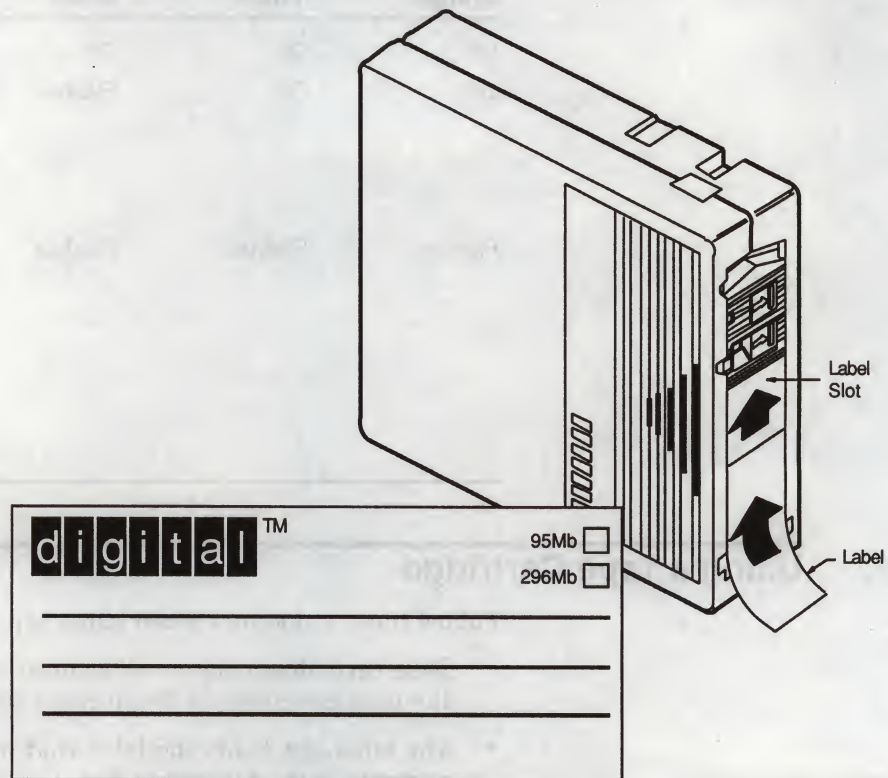
To label a tape cartridge, insert a slide-in label into the slot located on the front of the tape cartridge. Figure 1-6 shows how to insert a label on a tape cartridge.

Caution: Use only the label slot provided to label a tape cartridge. Applying adhesive labels or writing on the tape cartridge can damage it.

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1.6 Using a Tape Cartridge

Figure 1-6 Inserting a Label on a Tape Cartridge

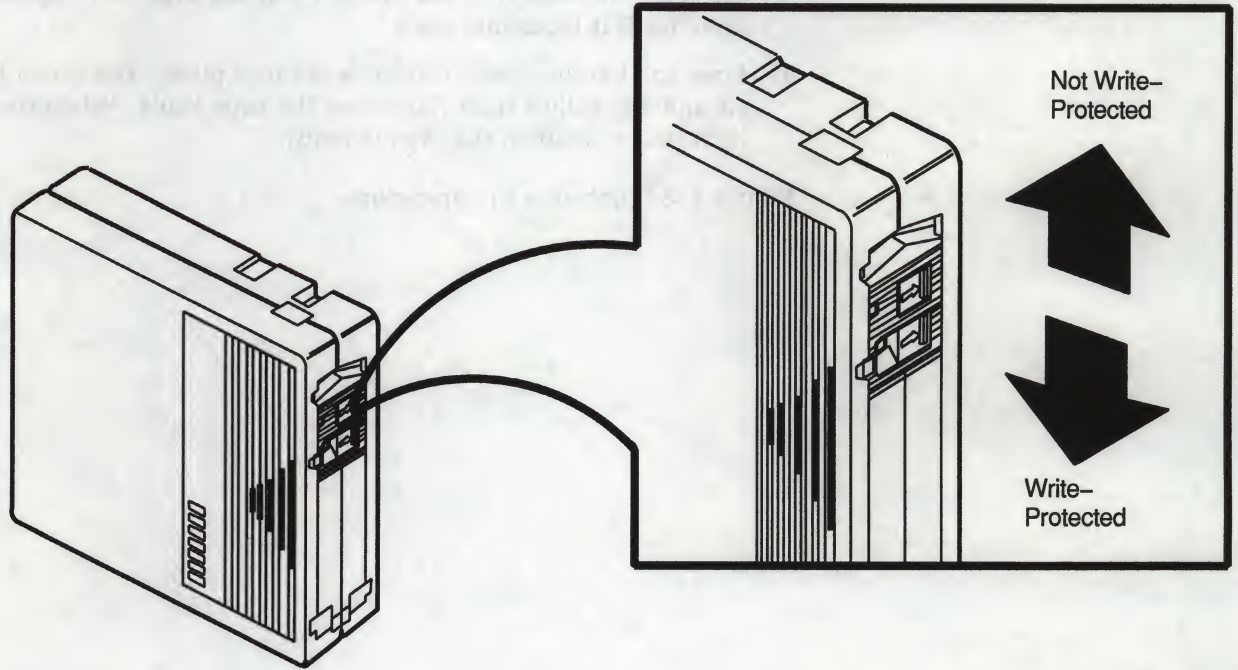


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- The write-protect switch is a movable switch on the tape cartridge that controls whether you can write to the tape. To write-protect a tape cartridge, slide the write-protect switch toward the label slot. An orange rectangle is visible when the tape cartridge is write-protected.

Always write-protect the distribution tape cartridge before an installation. Figure 1-7 shows how to write-protect a tape cartridge.

Figure 1-7 Positioning the Write-Protect Switch



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1.6.1 Inserting a Tape Cartridge into the Drive

To insert a tape cartridge into the drive, use the following procedure:

- 1 Make sure the tape cartridge drive is empty. If the VMS operating system is not running, go to step 2.

If the VMS operating system is running and if a tape cartridge is already in the drive, type the following command and press the Return key:

```
$ SHOW DEVICE MUA0
```

If the display indicates that the device status of the tape cartridge is MOUNTED, you must dismount the tape before removing it from the drive. Follow the directions in Section 1.6.4 to dismount the tape cartridge. Then follow the directions in Section 1.6.5 to remove the tape cartridge.

Caution: Never pull open the handle unless the green light glows and the yellow light is off; you might damage the drive.

- 2 When the green light glows and the yellow light is off, pull open the cartridge release handle.

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1.6 Using a Tape Cartridge

- 3 Hold the tape cartridge with the label facing you and with the large arrow on the top of the tape cartridge pointing into the drive. Insert the tape cartridge into the drive. Push the tape cartridge into the drive until it locks into place.
- 4 Push the handle closed until it locks into place. The green light goes off and the yellow light flashes as the tape loads. When the yellow light glows steadily, the tape is ready.

Figure 1-8 illustrates the procedure.

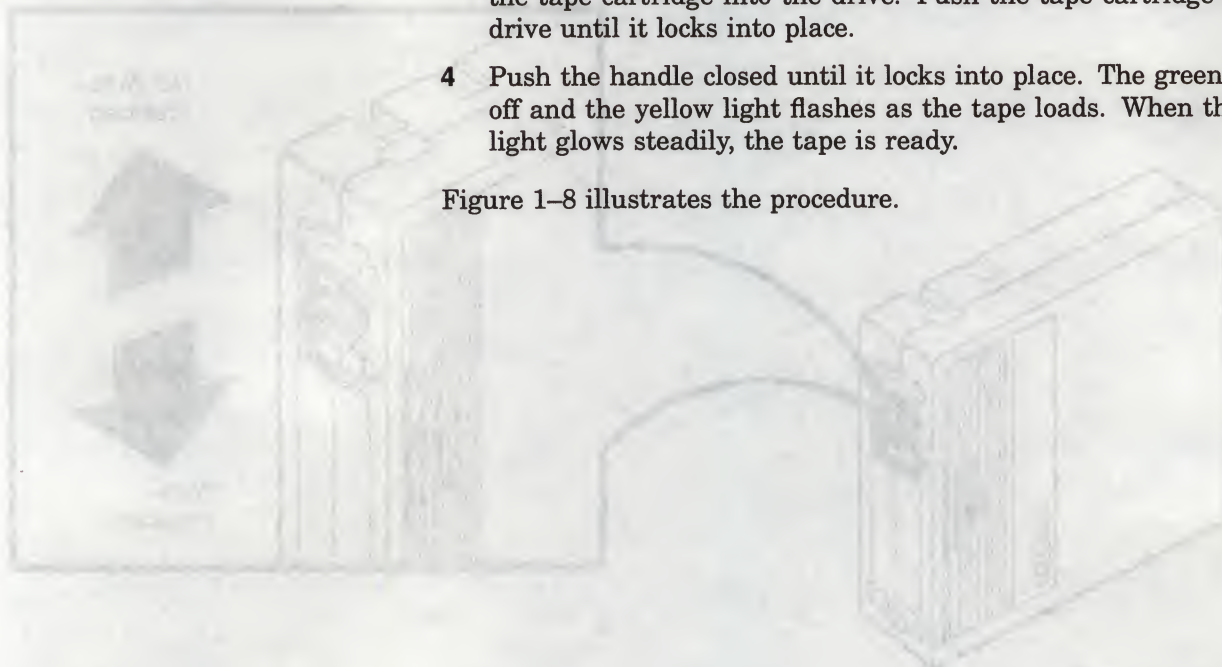
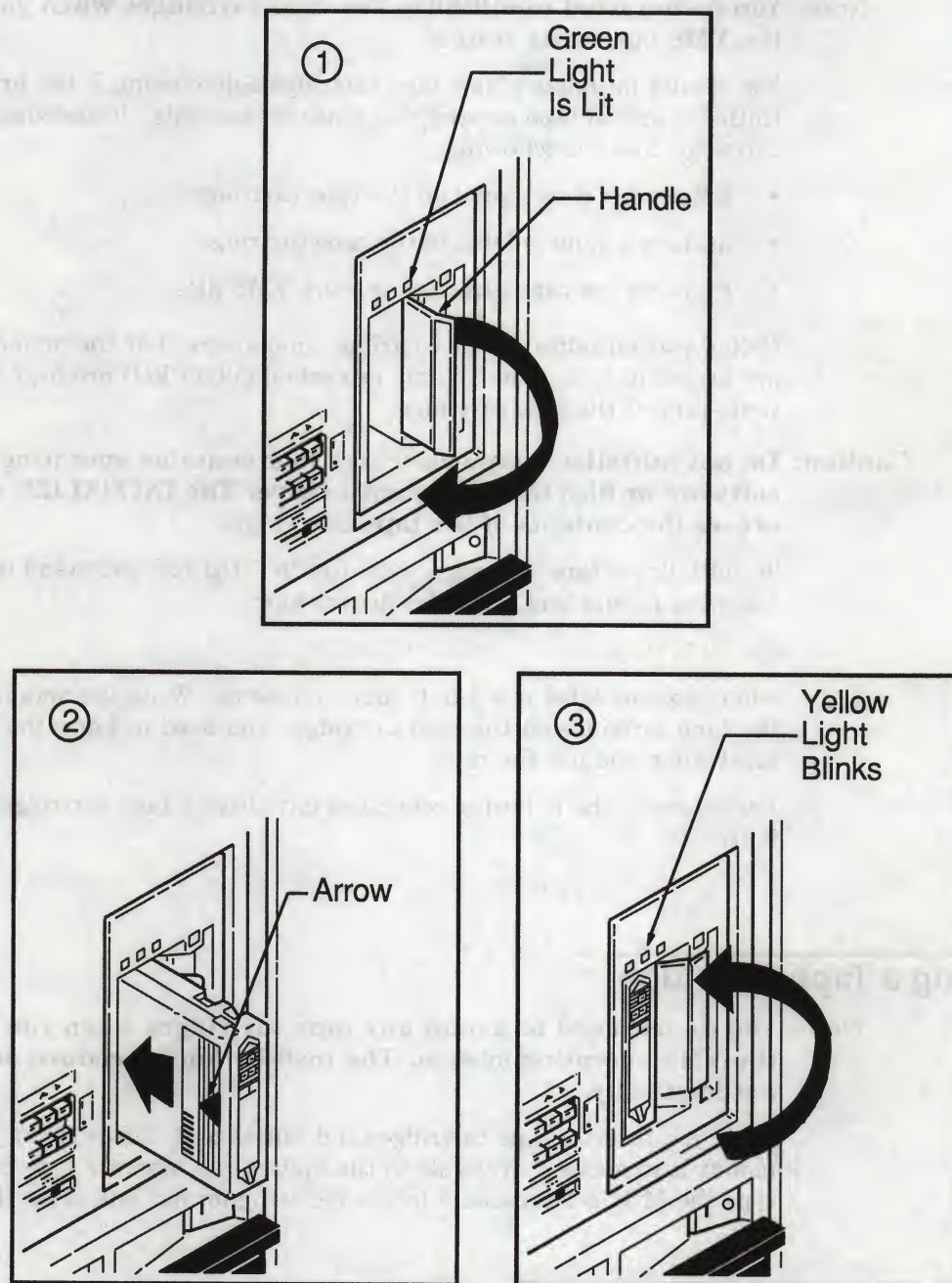


Figure 1-8 Inserting a Tape Cartridge into the Drive



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Hardware

1.6 Using a Tape Cartridge

1.6.2 Initializing a Tape Cartridge

Note: You do not need to initialize any tape cartridges when you install the VMS operating system.

You should initialize a new tape cartridge before using it the first time. Initialize an old tape cartridge to erase its contents. Initializing a tape cartridge does the following:

- Erases any data stored on the tape cartridge
- Assigns a volume label to the tape cartridge
- Prepares the tape cartridge to store VMS files

Before you initialize a tape cartridge, make sure that the account you are logged in to has the volume protection (VOLPRO) privilege. Do not write-protect the tape cartridge.

Caution: Do not initialize a tape cartridge that contains operating system software or files that you want to save. The INITIALIZE command erases the contents of the tape cartridge.

To initialize a tape cartridge, type the INITIALIZE command in the following format and press the Return key:

```
$ INITIALIZE MUA0 volume-label
```

where *volume-label* is a 1-to-6 character name. Write the volume label of the tape cartridge on the tape cartridge. You need to know the volume label when you use the tape.

For example, the following command initializes a tape cartridge and labels it DEC89:

```
$ INITIALIZE MUA0 DEC89
```

1.6.3 Mounting a Tape Cartridge

Note: You do not need to mount any tape cartridges when you install the VMS operating system. The installation procedure does this automatically.

After you insert a tape cartridge (and initialize it, if it is new), you must mount it to make it available to the system. To mount a tape cartridge, type the MOUNT command in the following format and press the Return key:

```
$ MOUNT MUA0 volume-label
```

where *volume-label* is a 1-to-6 character name that you assigned to the tape cartridge with the INITIALIZE command.

If you do not specify the correct volume label when you mount the tape cartridge, the system displays the following message:

```
%MOUNT-F-INCVOLLABEL, incorrect volume label
```


1.6 Using a Tape Cartridge

If you do not remember the volume label, type the MOUNT command in the following format and press Return:

```
$ MOUNT/OVERRIDE=IDENTIFICATION MUA0
```

Then enter the following command to determine the volume label of the tape cartridge:

```
$ SHOW DEVICE MUA0
```

The system displays the volume label.

1.6.4 Dismounting a Tape Cartridge

Note: You do not need to dismount any tape cartridges when you install the VMS operating system. The installation procedure does this automatically.

When you finish using a tape cartridge, you must dismount it. To dismount a tape cartridge, type the DISMOUNT command in the following format and press the Return key:

```
$ DISMOUNT MUA0
```

After you dismount the tape cartridge, you can remove it from the drive.

1.6.5 Removing a Tape Cartridge from the Drive

To remove a tape cartridge from the tape cartridge drive, use the following procedure:

- 1 Press the Unload button. If the tape is not rewound, the yellow light flashes slowly as the tape rewinds. When the tape is completely unloaded, the green light glows, the yellow light turns off, and you hear a beep.

Caution: Never pull open the handle unless the green light glows and the yellow light is off; you might damage the drive.

- 2 Pull open the cartridge release handle. The tape cartridge partially ejects.
- 3 Remove the tape cartridge and put it in its plastic case.
- 4 Push the handle closed until it locks firmly into place.

1.7 Rules for Configuring Your SCSI Bus

The SCSI bus on your system is sensitive to changes in configuration.

The following rules are for configuring an SCSI system. (Digital ensures that these requirements are met when it builds your system and when it services your equipment. If you must reconfigure your system, then you must follow these rules for the proper operation of the SCSI bus.)

- 1 There are no SCSI terminators on any drive in the system box or in expansion boxes.

Hardware

1.7 Rules for Configuring Your SCSI Bus

- 2 Cables supplied by Digital are used to connect expansion boxes.
- 3 The terminating connector supplied by Digital is plugged into the last SCSI jack on the external bus.

Caution: Violation of any of these rules may lead to serious consequences, including system crashes, loss of user data, and erratic system behavior.

2 Installing the VMS Operating System

The *VMS Upgrade and Installation Manual* is your *primary* source of information on installing the VMS operating system. Start any VMS installation or upgrade by following the instructions in the *VMS Upgrade and Installation Manual*.

Refer to this chapter for installation information specific to the VAXstation 3520, 3540 computers, such as the following:

- Determining device names (Section 2.1.1)
- Choosing a system disk (Section 2.1.2)
- Booting standalone BACKUP (Section 2.2)
- Booting the new system disk (Section 2.3)

If you are installing the VMS operating system on a VAX computer that is part of a VAXcluster environment, see also the *VMS VAXcluster Manual*. Note that the VAXstation 3520, 3540 computers cannot be part of a CI-only VAXcluster.

Note: The screen displays and examples in this manual depict the installation of VMS Version 5.4. Your screen displays reflect the version that you are installing.

2.1 Before Installing the VMS Operating System

Before beginning the VMS installation, you must determine the names of the devices you will use and choose a system disk. The following sections describe these tasks.

2.1.1 Determining Device Names

At different times during the installation, you need to tell the system which drive contains the distribution media and which drive contains the system disk. You refer to a drive by its *device name*. Before you begin the installation, determine the device names of the drives that will contain the system disk and distribution media.

The format for a device name depends on what type of drive you are using. For example, MUA0 is the device name for the tape cartridge drive. *MU* is the device code. *A* is the controller. *0* is the unit number.

Device names for the other types of drives on the VAXstation 3520, 3540 computers have the following format:

ddciuu

Installing the VMS Operating System

2.1 Before Installing the VMS Operating System

This format uses the following values:

- *dd* is the device code. The device code tells what type of drive you are using. DK is the device code for disk drives.
- *c* is the controller designation. The controller designation on the VAXstation 3520, 3540 computers is A.
- *i* is the SCSI ID (Small Computer Systems Interconnect identification) number. It can be a decimal number in the range of 0 to 7.
- *uu* is the logical unit number. It is usually zero.

For example, a fixed disk with a SCSI ID number of one has the device name DKA100. A fixed disk with a SCSI ID number of two has the device name DKA200. Note that when the SCSI ID number is zero, the device name is DKA0.

Enter the SHOW SCSI command at the console-mode prompt (>>>) to find out the device names of the disk and tape drives on your system. See Section 2.1.1.2 for more information on the SHOW SCSI command.

2.1.1.1 Summary of Device Names

Table 2-1 lists the device names for the VAXstation 3520, 3540 computers. Your system might not contain all of the devices shown.

Table 2-1 Device Names

Device	Device Name
Compact disc reader, RRD40	DKAiuu ¹
Fixed disk, RZ55	DKAiuu ¹
Integral Ethernet controller	ESA0
SCSI port	PKA
Tape cartridge drive, TK70	MUA0
TMSCP controller	PTA0

¹*i* stands for the SCSI ID number. *uu* stands for the logical unit number.

2.1.1.2 The Console Command SHOW SCSI

At the console-mode prompt (>>>), enter the SHOW SCSI command to display the list of disk and tape drives attached to your system. For example:

```
>>> SHOW SCSI
ADDR   VMB      DEVTYP  DEVNAM  NUMBYTES  REV   CONF  CHAR
-----
5.1.0   DKA100    DISK    RZ55    332 MB    0700  0011
5.3.0   DKA300    DISK    RZ55    332 MB    0700  0011
5.4.0   DKA400    RODISK  RRD40    599 MB    210D  0011  RM, WP
5.7             HOST    SII-A
```

Each column gives the following information:

- **ADDR**—the hardware address of the device (mid.id.un).

Installing the VMS Operating System

2.1 Before Installing the VMS Operating System

- **VMB**—the device name to use with VMS (if the first two letters are *xx*, then VMS does not recognize the device).
- **DEVTYPE**—the device type. The following are the possible device types:

Code	What it means
DISK	Direct-access device
TAPE	Sequential-access device
PRTR	Printer device
PROC	Processor device
WODISK	Write-once read-multiple device
RODISK	Read-only direct-access device
SCAN	Scanner device
OPDISK	Optical memory devices
CHNGR	Change device
COMM	Communications device
UNKNWN	Reserved or unknown device type

- **DEVNAM**—the name of the device.
- **NUMBYTES**—the capacity of the device.
- **CONF**—the conformance level of the device. The first digit is for ISO, the second for ECMA, and the third for ANSI. The fourth digit indicates the response data format. A value of zero indicates no conformance to the indicated standard.
- **CHAR**—displays additional information about the device. *WP* means the device is write-protected, *RM* means the device has removable media. *WP?* means the write-protect status could not be determined.

Go to Section 2.1.2 to choose a system disk

2.1.2 Choosing a System Disk

Your system can contain one or more fixed disks, one Ethernet port, and a tape cartridge drive. Options are available for additional disk or tape drives, including a compact disc drive.

You can use any of the disk drives (except the compact disc drive) as the system disk. When choosing a system disk, you need to be aware of the capacity of the disk, as well as the size of the VMS operating system. Keep in mind that a system disk in a VAXcluster environment needs more space for the operating system than a system disk for a standalone system.

The system uniquely names each drive attached to it. Before you begin the installation procedure, make sure you know the device names for both the drive that will hold the distribution media and the drive that will hold the system disk. At the console-mode prompt (**>>>**), enter the **SHOW SCSI** command. Determine the device name of the system disk and write it on a piece of paper. You need this information throughout the installation.

Installing the VMS Operating System

2.1 Before Installing the VMS Operating System

Return to the *VMS Upgrade and Installation Manual* to begin the installation.

2.2 Booting Standalone BACKUP

This section describes the procedure for booting standalone BACKUP. Standalone BACKUP lets you transfer the VMS *required* save set from the distribution kit to your system disk. The method you use to boot standalone BACKUP depends on the type of distribution kit you have.

- Tape cartridge kit—Follow the instructions in Section 2.2.1.
- Compact disc kit—Follow the instructions in Section 2.2.2.

2.2.1 Tape Cartridge Kit

If you have a tape cartridge distribution kit, you boot standalone BACKUP from a tape cartridge. The tape cartridge that contains standalone BACKUP is labeled similar to the following:

Paper Label ¹	Volume Label ²
VMS V5.4 BIN TK50 2/2 S/A BKUP - DECwindows	DECW54

¹A paper label is a label affixed to a tape cartridge.

²A volume label is the name the VMS operating system uses to refer to a tape cartridge. During the installation the procedure displays the volume label, not the paper label, in messages.

Booting standalone BACKUP from tape cartridge takes approximately 25 minutes. To boot standalone BACKUP, perform the following steps:

- 1 Insert the tape cartridge labeled *VMS V5.4 BIN TK50 2/2* into the tape cartridge drive. See Section 1.6.1 for instructions on inserting a tape cartridge.

- 2 Enter the following command and press the Return key:

```
>>> B MUA0
```

- 3 Approximately 10 minutes later, standalone BACKUP displays the following message:

```
VAX/VMS Version V5.4 Major version id = 1 Minor version id = 0
```

- 4 Approximately 15 minutes later the procedure asks for the date and time. Enter the date and time using the 24-hour clock format and press Return. For example:

```
PLEASE ENTER DATE AND TIME (DD-MMM-YYYY HH:MM) 05-JUL-1990 13:00
```

- 5 After approximately 1 minute, the procedure displays a list of the devices on your system. For example:

Installing the VMS Operating System

2.2 Booting Standalone BACKUP

Available device DKA0: device type RZ55
Available device MUA0: device type TK70

.

Check the list of devices. If the list is incomplete, make sure that all the drives are connected properly to the system. See your hardware manuals for details.

- 6 When standalone BACKUP finishes booting, the procedure displays an identification message followed by the dollar sign prompt (\$).

%BACKUP-I-IDENT, Stand-alone BACKUP V5.4; the date is 05-JUL-1990 13:00

\$

- 7 Return to the *VMS Upgrade and Installation Manual* to continue with the installation.

2.2.2 Compact Disc Kit

If you have a compact disc distribution kit, you boot standalone BACKUP from the compact disc. The compact disc has a label similar to the following:

Label	Volume Label ¹
VMS V5.4 BIN CDROM	SYSTEM

¹A volume label is the name the VMS operating system uses to refer to a compact disc. During the installation, the procedure displays the volume label in messages.

Booting standalone BACKUP from compact disc takes approximately 4 minutes. To boot standalone BACKUP, perform the following steps:

- 1 Insert the distribution compact disc into the compact disc drive. See Section 1.4.2 for instructions on inserting a compact disc.
- 2 Enter a BOOT command command in the following format:

>>> B device-name

Substitute the device name of the compact disc drive for *device-name*. For example, if the compact disc drive has a device name of DKA300, enter the following BOOT command and press the Return key:

>>> B DKA300

Note: Make sure the compact disc is in the drive *before* you enter the BOOT command. If you try to boot standalone BACKUP while there is no compact disc in the drive, the following error message will be displayed:

DKA400 Device type is not recognized

- 3 A few minutes later standalone BACKUP displays the following message:

VAX/VMS Version V5.4 Major version id = 1 Minor version id = 0

Installing the VMS Operating System

2.2 Booting Standalone BACKUP

- 4 A few minutes later the procedure asks for the date and time. Enter the date and time using the 24-hour clock format and press Return. For example:

PLEASE ENTER DATE AND TIME (DD-MMM-YYYY HH:MM) 05-JUL-1990 13:00

- 5 After approximately 1 minute, the procedure displays a list of the devices on your system. For example:

Available device DKA0: device type RZ55
Available device MUA0: device type TK70

Check the list of devices. If the list is incomplete, make sure that all the drives are connected properly to the system. See your hardware manuals for details.

- 6 When standalone BACKUP finishes booting, the procedure displays an identification message followed by the dollar sign prompt (\$):

%BACKUP-I-IDENT, Stand-alone BACKUP V5.4; the date is 05-JUL-1990 13:00
\$

- 7 Return to the *VMS Upgrade and Installation Manual* to continue with the installation.

2.3 Booting the New System Disk

As a result of the BACKUP command you type to start an installation, the *required* save set on the distribution kit is transferred to the system disk.

During the process, the procedure displays the following message:

%BACKUP-I-STARTVERIFY, starting verification pass

This message indicates that the *required* save set has been transferred to the system disk and the files are being checked for errors. Approximately 25 minutes later, the procedure displays the following message:

%BACKUP-I-PROCDONE, operation completed. Processing finished at 05-JUL-1990 13:00:00.00
If you do not want to perform another standalone BACKUP operation, use the console to halt the system.

If you do want to perform another standalone BACKUP operation, ensure the standalone application volume is online and ready. Enter "YES" to continue:

To continue with the installation, halt the system and boot the system disk as follows:

- 1 Press the Halt button. See Figure 1-1 for the location of the Halt button.
- 2 Enter the SET BOOT command in the following format:

>>> SET BOOT target-drive

Installing the VMS Operating System

2.3 Booting the New System Disk

Substitute the device name of the system disk for *target-drive*. The SET BOOT command tells the procedure what disk to boot from. For example, if the system disk is an RZ55 disk with a device name of DKA100, enter the following command and press the Return key:

```
>>> SET BOOT DKA100
```

- 3 To boot the system disk, enter the BOOT command and press Return:

```
>>> B
```

- 4 When the boot is complete, the procedure displays a message and asks for the date and time.

If the system does not boot, a hardware or software problem might exist. Refer to Section 3.1.9 for the symptoms of hardware and software problems and actions you can take to correct these problems.

- 5 Return to the *VMS Upgrade and Installation Manual* to continue with the installation.

Installing the VM: Operating System

2.3 Installing the New System Disk

Configure the system to boot from the new system disk. The VM: Operating System will be installed on the new system disk. The VM: Operating System will be installed on the new system disk. The VM: Operating System will be installed on the new system disk.

2.3.1 Installing the New System Disk

Follow the steps in the VM: Operating System manual to install the new system disk. The VM: Operating System will be installed on the new system disk.

2.3.2 Installing the New System Disk

Follow the steps in the VM: Operating System manual to install the new system disk. The VM: Operating System will be installed on the new system disk.

3 Startup and Shutdown Procedures

During a VMS installation or upgrade, your system will shut down and reboot several times. Although the installation and upgrade procedures usually perform these tasks automatically, you might want to manually shut down or reboot your system. You will also occasionally need to reboot the system during normal operation. This chapter describes different ways to boot and shut down the system.

3.1 Booting the System

Booting is the process of loading system software into the processor's memory. The VAXstation 3520, 3540 computers use an internal memory device to boot the VMS operating system from the system disk into memory.

The boot process consists of the following steps:

- 1 You enter the **BOOT** command. The boot procedure deposits information in the general purpose registers.
- 2 **VMB**, the primary boot program, is loaded from the system ROMs. **VMB** is a program that allows access to the system disk. **VMB** locates **SYS\$SYSTEM:SYSBOOT.EXE** on the system disk and loads it into memory.
- 3 **SYSBOOT.EXE** loads the **SYSGEN** parameters stored in **SYS\$SYSTEM:VAXVMSSYS.PAR** and checks the conversational boot flag. If the flag is set, the procedure stops and displays the **SYSBOOT>** prompt. If the flag is not set, **SYSBOOT.EXE** loads the VMS executive into memory and transfers control to the VMS executive.
- 4 When the VMS executive finishes, it executes the **SWAPPER** process.
- 5 The **SWAPPER** creates the **SYSINIT** process.
- 6 **SYSINIT** creates the **STARTUP** process.
- 7 **STARTUP** executes **SYS\$SYSTEM:STARTUP.COM** (unless you indicated another file at the **SYSBOOT>** prompt) and **SYSTARTUP_V5.COM**. The current values of **SYSGEN** parameters are written back to **VAXVMSSYS.PAR**.
- 8 The boot process finishes, and you can log in to the VMS operating system.

By setting certain **SYSGEN** parameters, you can control how many CPUs are activated at boot time and the character of a multiprocessing system. In a multiprocessing system, the primary CPU is always booted. By default, all available CPUs are also booted. If you want to change this, you can set the **SYSGEN** parameter **SMP_CPUS** to tell the system which secondary CPUs to boot. For information on **SYSGEN** parameters that affect multiprocessing, see the *VMS System Generation Utility Manual*.

Startup and Shutdown Procedures

3.1 Booting the System

3.1.1 Manual Boot

To manually boot the VMS operating system from the system disk, use the following procedure:

- 1 Make sure the monitor is set up properly and turned on.
- 2 Make sure the computer is set up properly and turned on.
- 3 If the VMS operating system is not running, go to step 4.

If the VMS operating system is running, log in to the SYSTEM account. Enter the following command and press the Return key:

```
$ @SYS$SYSTEM:SHUTDOWN
```

Answer the questions. When the procedure asks if an automatic system reboot should be performed, press Return for NO. When the procedure is finished, it displays the following message:

```
SYSTEM SHUTDOWN COMPLETE - USE CONSOLE TO HALT SYSTEM
```

- 4 Press the Halt button. See Figure 1-1 for the location of the Halt button.
- 5 Enter the BOOT command in the following format:

```
>>> B device-name
```

Substitute the device name of the system disk for *device-name*. For example, to boot from a drive with a device name of DKA100, enter the following command and press Return:

```
>>> B DKA100
```

For information on device names for the VAXstation 3520, 3540 computers, see Section 2.1.1.

- 6 After the system boots, it displays the following message:

```
VAX/VMS Version V5.4 05-JUL-1990 15:00
```

```
The VAX/VMS system is now executing the system startup procedure.
```

```
The VAX/VMS system is now executing the site-specific startup commands.
```

```
%SET-I-INTSET, login interactive limit=64, current interactive value = 0  
SYSTEM      job terminated at 05-JUL-1990 15:00:00.00
```

3.1.2 Booting from the Network

To boot from the network, enter the following command and press the Return key:

```
>>> B ESA0
```


3.1.3 Using the SET BOOT and SHOW BOOT Commands

There are two commands you can use at the console-mode prompt (>>>) to set, display, and cancel the drive from which you want the system to boot.

Use the SET BOOT command to tell the system what drive you want to boot from. Enter the SET BOOT command in the following format:

```
>>> SET BOOT device-name
```

Substitute the device name of the system disk for *device-name*. For example, to boot from a drive with a device name of DKA100, enter the following command and press the Return key:

```
>>> SET BOOT DKA100
```

The next time you boot the system you can enter the BOOT command without specifying a device name. For example:

```
>>> B
```

Use the SHOW BOOT command to find out what drive was specified in the last SET BOOT command. For example:

```
>>> SHOW BOOT
```

To cancel the drive specified in the last SET BOOT command, enter the following command and press Return:

```
>>> SET BOOT
```

If you have not used the SET BOOT command to tell the system which drive to boot from and you enter the BOOT command without specifying a device name, the system will ask you for a device name. If you do not enter a device name within 30 seconds, the system boots from the primary Ethernet device, ESA0.

3.1.4 Automatic Boot

The VAXstation 3520, 3540 computers boot automatically under the following circumstances:

- If you selected the auto reboot option during normal system shutdown
- After a system crash

The system boots from the drive specified by the last SET BOOT command. You might be asked to enter the date and time during the automatic boot.

You can also use the SET BOOT console command to determine what happens when the system is turned on. See the hardware manuals for more information.

Startup and Shutdown Procedures

3.1 Booting the System

3.1.5 Conversational Boot

A conversational boot is most commonly used in research and development environments and during software upgrades. Perform a conversational boot when you want to stop the boot process before it completes. The boot process stops after it loads SYS\$SYSTEM:SYSBOOT.EXE and displays the SYSBOOT> prompt. At the SYSBOOT> prompt, you can enter certain SYSGEN commands to do the following:

- Look at system parameter values
- Change system parameter values
- Specify another parameter file
- Specify another system startup command procedure
- Select the default system parameter file if you modified system parameters to values that render the system unbootable
- Specify a minimum startup

There are several ways to perform a conversational boot. The following is the most direct:

- 1 If the VMS operating system is not running, go to step 2.

If the VMS operating system is running, log in to the SYSTEM account. Enter the following command and press the Return key:

```
$ @SYS$SYSTEM:SHUTDOWN
```

Answer the questions. When the procedure asks if an automatic system reboot should be performed, press Return for NO. When the procedure is finished, it displays the following message:

```
SYSTEM SHUTDOWN COMPLETE - USE CONSOLE TO HALT SYSTEM
```

- 2 Press the Halt button. See Figure 1-1 for the location of the Halt button.
- 3 To begin the conversational boot, enter the BOOT command in the following format:

```
>>> B/1 [device-name]
```

Substitute the device name of the drive from which you want to boot for *device-name*. If you do not specify a device name, the VAXstation 3520, 3540 computers boot from the device specified by the last SET BOOT command.

- 4 At the SYSBOOT> prompt, you can enter any of the SYSGEN commands listed in Table 3-1. For more information about these SYSGEN commands, see the *VMS System Generation Utility Manual*.
- 5 When you finish using the SYSGEN commands, enter the CONTINUE command to complete the boot process.

Startup and Shutdown Procedures

3.1 Booting the System

Table 3-1 SYSGEN Commands Used in SYSBOOT

Command	Description
CONTINUE	Resumes the boot process.
DISABLE CHECKS	Inhibits checking of parameter values specified with the SET command.
ENABLE CHECKS	Permits checking of parameter values specified with the SET command.
HELP	Displays a summary of the SYSBOOT commands on the terminal screen.
SET parameter-name	Establishes the name of a system parameter.
SET/STARTUP	Sets the name of the system startup command procedure.
SHOW parameter-name	Displays active, current, default, maximum, and minimum values for specific parameters. Use qualifiers to display characteristics of parameters grouped by categories.
USE file-spec	Specifies a parameter file to be used as a source of values (you must enter the entire file specification, including device and directory; you cannot specify a logical name).

The following examples illustrate some operations you can perform during a conversational boot.

You can enter the following commands to set a new value for the SYSGEN parameter WSMAX to 512 and to complete the boot process:

```
SYSBOOT> SET WSMAX 512
SYSBOOT> CONTINUE
```

When the VMS operating system displays the following message, the new SYSGEN parameter value becomes active:

```
SYSTEM job terminated at 05-JUL-1990 13:00:00.00
```

If you modified the system parameters to values that render the system unbootable, enter the following commands to boot using default values:

```
SYSBOOT> USE DEFAULT
SYSBOOT> CONTINUE
```

You also can use a conversational boot to specify a minimum startup. For example, if you want to boot the system and avoid configuring all your peripheral devices automatically, enter the following command and press the Return key:

```
SYSBOOT> SET STARTUP_P1 "MIN"
```

This command initiates a minimum startup that performs the following sequence of operations:

- 1 Starts the processes that control error logging, the job controller, and the operator's log
- 2 Installs known images

Startup and Shutdown Procedures

3.1 Booting the System

- 3 Defines the number of interactive users as eight
- 4 Logs off

Because this procedure does not call SYSTARTUP_V5.COM, it does not autoconfigure the system's peripheral devices.

The value of STARTUP_P1 is saved and affects future boot operations. After the operating system boots, you can log in to the SYSTEM account and run SYSGEN to reset STARTUP_P1. For example, enter the following commands to reset STARTUP_P1 to its default value (null):

```
$ RUN SYS$SYSTEM:SYSGEN
SYSGEN> USE CURRENT
SYSGEN> SET STARTUP_P1 ""
SYSGEN> WRITE CURRENT
SYSGEN> EXIT
$
```

3.1.6 Booting from a Different Directory on the System Disk

To boot the system from a directory other than [SYS0], enter the BOOT command in the following format and press the Return key:

```
>>> B/n0000000 device-name
```

Substitute the device name of the system disk for *device-name*. Table 2-1 contains a list of device names for all VAXstation 3520, 3540 devices.

For example, to boot from root directory [SYS1] on an RZ55 fixed disk with the device name DKA1, type the following command and press Return:

```
>>> B/10000000 DKA1
```

3.1.7 Booting from [SYSF] During an Upgrade

During the upgrade procedure, you will be instructed to boot the system from the [SYSF] directory.

To boot the system from the [SYSF] directory, enter the boot command in the following format and press the Return key:

```
>>> B/F0000000 device-name
```

Substitute the device name of the system disk for *device-name*. Table 2-1 contains a list of device names for all VAXstation 3520, 3540 devices.

For example, to boot from the [SYSF] directory on an RZ55 fixed disk with the device name DKA1, type the following command and press Return:

```
>>> B/F0000000 DKA1
```

3.1.8 Booting with XDELTA

XDELTA is a debugging tool that system programmers use. To use XDELTA, you need to boot the system in a special way. For information on booting with XDELTA, see the *VMS Delta/XDelta Utility Manual*.

Startup and Shutdown Procedures

3.1 Booting the System

3.1.9 If the System Does Not Boot

If the system does not boot because a hardware problem occurs, a question mark (?) usually precedes the error message displayed on the console terminal. Examples of hardware problems are a read error on a disk drive, or a machine check error. If you suspect a hardware problem, do the following:

- Consult the hardware manual for your VAX computer
- Contact Digital Customer Services.

When the operating system is loaded into memory, the system displays the following message:

```
SYSTEM          job terminated at 05-JUL-1990 13:00:00.00
```

If the system does not display this message, a software problem has probably occurred. Do the following:

- Turn off the system. Turn it on again and try to boot.
- Do a conversational boot using the default SYSGEN parameters described in Section 3.1.5. If the system boots, run AUTOGEN. For more information on AUTOGEN, see the *Guide to Setting Up a VMS System*.

3.2 Shutting Down the System

Before you shut down the operating system, decide if you want it to reboot automatically or if you want to enter console-mode commands after the shutdown completes.

You can perform the following three types of shutdown operations:

- Orderly shutdown with SYS\$SYSTEM:SHUTDOWN.COM. This procedure shuts down the system after performing maintenance functions.
- Emergency shutdown with OPCCRASH.EXE. Use this procedure if you cannot perform an orderly shutdown with SHUTDOWN.COM.
- Emergency shutdown with CRASH commands. Use the CRASH commands only if OPCCRASH fails.

The following sections describe each type of shutdown.

3.2.1 Orderly Shutdown with SHUTDOWN.COM

This procedure shuts down the system while performing maintenance functions such as disabling future logins, stopping the batch and printer queues, dismounting volumes, and stopping user processes. To use the SHUTDOWN command procedure, log in to the SYSTEM account, enter the following command, and press the Return key:

```
$ @SYS$SYSTEM:SHUTDOWN
```


Startup and Shutdown Procedures

3.2 Shutting Down the System

To halt the system after the procedure completes, press the Halt button. See Figure 1-1 for the location of the Halt button.

If you use the Halt button to stop the system, you can enter the CONTINUE command to restart the system. For example, the following command restarts only the primary CPU:

```
>>> CONTINUE
```

The following command restarts all the CPUs:

```
>>> CONTINUE/ALL
```

For more information about the SHUTDOWN command procedure, see the *Guide to Setting Up a VMS System*.

3.2.2 Emergency Shutdown with OPCCRASH.EXE

If you cannot perform an orderly shutdown with SHUTDOWN.COM, run the OPCCRASH emergency shutdown program. Log in to the SYSTEM account, enter the following command, and press Return:

```
$ RUN SYS$SYSTEM:OPCCRASH
```

To halt the system after the procedure completes, press the Halt button. (If you use the Halt button to stop the system, you can enter the CONTINUE command to restart the system. For more information, see Section 3.2.1.)

For more information about the OPCCRASH program, see the *Guide to Setting Up a VMS System*.

3.2.3 Emergency Shutdown with CRASH Commands

Note: Use CRASH commands only if the system is hung and you cannot log in to the SYSTEM account to use SHUTDOWN or OPCCRASH.

CRASH commands cause the system to fail, resulting in immediate shutdown. To force your system to fail, use the following procedure:

- 1 Press the Halt button.
- 2 Enter the following commands and press the Return key after each one:

```
>>> E PSL
>>> E I/N:4 0
>>> D PC FFFFFFFF
>>> D PSL 41F0000
>>> C
```

CRASH commands display a fatal bugcheck message as well as additional messages and information. The procedure examines the program counter (PC), the processor status longword (PSL), and the stack pointers. It then deposits values in the PC and PSL to cause an exception condition that sends the contents of memory to the dump file on the system disk. Later, you can read the dump file to determine why the system did not respond.

Startup and Shutdown Procedures

3.2 Shutting Down the System

- 3 CRASH commands stop the system, display the contents of the program counter, and display the console-mode prompt (>>>).

After the CRASH commands execute, the system reboots from the boot device defined in the last SET BOOT command. If you have not specified a default boot device with the SET BOOT command, you will need to reboot the system manually.

- 4 After the system reboots, you can examine the dump file. To examine the dump file, log in to the SYSTEM account. Enter the following commands and press Return after each one:

```
$ ANALYZE/CRASH SYS$SYSTEM:SYSDUMP.DMP  
SDA> SHOW CRASH
```

For more information about the System Dump Analyzer (SDA), see the *VMS System Dump Analyzer Utility Manual*.

3.3 If the System Fails

Your system can fail in the following ways:

- Bugcheck—The system displays a bugcheck message and shuts itself down. This happens because the system encountered a problem that made further operation impossible or dangerous. Boot the system manually as explained in Section 3.1.1, or let it reboot automatically as explained in Section 3.1.4.
- Hang—The system stops responding to your commands. The problem could be a failure in a system software or hardware component or a power failure.
- Erratic behavior—The system does not respond according to specifications. The problem could be a failure in system software or a hardware component.

To see if the failure is a system problem and not something you have done, do the following:

- Press Ctrl/T to check the status of your process. A status line should be displayed, indicating the name of the program that is executing and other information. If the status line is not displayed, the system is probably hung. If the status line is displayed, the program you are executing may be hung. (If you have disabled Ctrl/T by entering the command SET NOCONTROL=T or have set the terminal to nobroadcast mode by entering the command SET TERMINAL /NOBROADCAST, this procedure does not work.)
- Make sure that the cable connecting the monitor to the system is secure.

Usually you can force an exit from a hung program by pressing Ctrl/Y. When you press Ctrl/Y, any work performed by the program that has not been saved on disk, is lost.

Startup and Shutdown Procedures

3.3 If the System Fails

If the system is hung, you must reboot without a normal shutdown. Press the Halt button. See Figure 1-1 for the location of the Halt button. At the console-mode prompt (`>>>`) enter the CRASH commands as described in Section 3.2.3. Then, boot the system as described in Section 3.1.1.

If you have a problem with the system that Digital has not previously warned you about, note in detail the sequence of events that caused the problem and notify Digital Customer Services.

4 Backup Procedures

Standalone BACKUP makes an exact copy of the system disk. You should back up the system disk for the following reasons:

- In case a problem occurs during a VMS upgrade or update or during the installation of other software products. *Before* you attempt any of these procedures, you should back up the system disk. If a problem occurs, you can restore the backup copy of the system disk.
- To prevent loss of system files if they are deleted accidentally. *After* you install or upgrade the VMS operating system or any other software products, you should back up the system disk. If a system file is deleted and renders the system disk inoperable, you can restore the backup copy and continue to use the system.
- If the drive that holds the system disk malfunctions, you can restore the backup to a functioning disk and continue to use the system.
- To eliminate disk fragmentation. Fragmentation happens when files are stored noncontiguously on the disk. The BACKUP command creates a copy on which files are stored contiguously.
 - If the system disk is removable, eliminating disk fragmentation is a one-step process. Use the backup copy as the new system disk. Store the old system disk in a safe place.
 - If the system disk is fixed, back it up to a disk or magnetic tape. Then restore the files to the original system disk.

Digital recommends that you use standalone BACKUP, which uses a subset of Backup Utility qualifiers, to back up and restore the system disk.

This chapter describes the following procedures:

- Installing and booting standalone BACKUP on the system disk
- Installing and booting standalone BACKUP on a tape cartridge
- Backing up and restoring the system disk

4.1 Using Standalone BACKUP

Use standalone BACKUP to make a complete backup of the system disk. Standalone BACKUP is a version of the Backup Utility that runs without the support of the entire VMS operating system.

The VMS Backup Utility lets you create and restore backup copies of files, directories, and user disks. However, because the Backup Utility copies only what is on the disk and ignores sections of any open files contained in memory, you should use it to back up user disks, not the system disk. If you use the Backup Utility instead of standalone BACKUP to back up the system disk, the resulting backup copy will not contain portions of the files

Backup Procedures

4.1 Using Standalone BACKUP

that were in memory or data about files not yet written back to the disk (cache).

Before you use standalone BACKUP, you must shut down the VMS operating system. The shutdown procedure sends the contents of the caches back to the disk and closes any open files. By shutting down the system and using standalone BACKUP, you ensure an exact copy of the system disk.

You can keep standalone BACKUP on the system disk, on a tape cartridge, or on any other media that the system supports. Digital recommends that you keep standalone BACKUP on your system disk and on a tape cartridge. Usually, you boot standalone BACKUP from the system disk because it saves time. However, you need to keep a copy of standalone BACKUP on a tape cartridge in case the system disk becomes damaged. If you have a tape cartridge distribution kit, you received standalone BACKUP on a tape cartridge.

4.2 Installing Standalone BACKUP on the System Disk

You can install standalone BACKUP in any available root directory on the system disk from [SYS1] to [SYSE]. However, Digital has established [SYSE] as the standard directory for standalone BACKUP.

To install standalone BACKUP in [SYSE] on the system disk, use the following procedure:

- 1 Log in to the SYSTEM account.
- 2 Enter the following command and press the Return key:

```
$ @SYS$UPDATE:STABACKIT SYS$SYSDEVICE:
```

The procedure places the files in the directories [SYSE.SYSEXE] and [SYSE.SYS\$LDR] on the system disk. It lists the files as they are copied. When the procedure is finished, it displays the following message:

The kit is complete.

- 3 To boot standalone BACKUP from the system disk, go to Section 4.3.

4.3 Booting Standalone BACKUP from the System Disk

To boot standalone BACKUP from the system disk, use the following procedure:

- 1 If the VMS operating system is not running, go to step 2.

If the VMS operating system is running, log in to the SYSTEM account. Enter the following command and press the Return key:

```
$ @SYS$SYSTEM:SHUTDOWN
```

Answer the questions. When the procedure asks if an automatic system reboot should be performed, press Return for NO. When the procedure is finished, it displays the following message:

```
SYSTEM SHUTDOWN COMPLETE -- USE CONSOLE TO HALT SYSTEM
```


4.3 Booting Standalone BACKUP from the System Disk

- 2 Press the Halt button. See Figure 1-1 for the location of the Halt button.
- 3 Enter the BOOT command in the following format and press Return:

```
>>> B/E0000000 device-name
```

Substitute the device name of the system disk for *device-name*. For example, to boot from a drive with a device name of DKA100, enter the following command and press Return:

```
>>> B/E0000000 DKA100
```

For more information on device names, see Section 2.1.1.

- 4 A few minutes later the procedure asks for the date and time. Enter the date and time using the 24-hour clock format and press Return. For example:

```
PLEASE ENTER DATE AND TIME (DD-MMM-YYYY HH:MM) 05-JUL-1990 13:00
```

- 5 The procedure displays a list of the devices on your system. For example:

```
Available device DKA0:    device type RZ55
Available device MUA0:    device type TK70
```

```
.
```

Check the list of devices. If the list is incomplete, make sure that all the drives are connected properly to the system. See your hardware manuals for details.

- 6 When standalone BACKUP finishes booting, it displays an identification message followed by the dollar sign prompt (\$).

```
%BACKUP-I-IDENT, Standalone BACKUP V5.4; the date is 05-JUL-1990 13:00
$
```

To back up the system disk, go to Section 4.6.

To restore the system disk, go to Section 4.7.

4.4 Installing Standalone BACKUP on a Tape Cartridge

Digital recommends that you keep standalone BACKUP on a tape cartridge in case the system disk becomes damaged. To install standalone BACKUP on a tape cartridge, use the following procedure.

Note: If you have the VMS tape cartridge distribution kit, you have standalone BACKUP on tape cartridge. If the original tape cartridge becomes damaged, or if you want to make extra copies, use this procedure.

- 1 Obtain a tape cartridge. Write the name S/A BKUP V5.4 on the paper label. Insert the label into the label slot.
- 2 Write-enable the tape cartridge.
- 3 Insert the tape cartridge labeled S/A BKUP V5.4 into the tape cartridge drive.

Backup Procedures

4.4 Installing Standalone BACKUP on a Tape Cartridge

- 4 Log in to the SYSTEM account.
- 5 Enter the following command and press the Return key:

```
$ @SYS$UPDATE:STABACKIT MUA0
```
- 6 The procedure displays the following message:
.
.
.
Please place the scratch tape cartridge in drive _MUA0:..
This volume will receive the volume label SYSTEM.
Enter "YES" when ready:
- 7 When you are ready to continue, type Y and press Return. The procedure displays verification messages informing you that files are being copied. When it finishes, it displays a message similar to the following:

```
Ending time    05-JUL-1990 13:45:29.90  
Starting time  05-JUL-1990 13:22:39.05  
  
The kit is complete.
```
- 8 Remove the tape cartridge labeled S/A BKUP V5.4 from the tape cartridge drive.

Write-protect the tape cartridge and store it in a safe place.

4.5 Booting Standalone BACKUP from a Tape Cartridge

If the system disk containing standalone BACKUP becomes unusable, you can boot standalone BACKUP from a tape cartridge. You need a tape cartridge that contains standalone BACKUP (either the distribution tape cartridge or one you created). To boot standalone BACKUP from a tape cartridge, use the following procedure:

- 1 If the VMS operating system is not running, go to step 2.

If the VMS operating system is running, log in to the SYSTEM account. Then, enter the following command and press the Return key:

```
$ @SYS$SYSTEM:SHUTDOWN
```


Answer the questions. When the procedure asks if an automatic system reboot should be performed, press Return for NO. When the procedure is finished, it displays the following message:

```
SYSTEM SHUTDOWN COMPLETE -- USE CONSOLE TO HALT SYSTEM
```
- 2 Press the Halt button. See Figure 1-1 for the location of the Halt button.
- 3 Insert the tape cartridge containing standalone BACKUP into the tape cartridge drive.

4.5 Booting Standalone BACKUP from a Tape Cartridge

- 4 Enter the following command and press Return:

```
>>> B MUA0
```

Note: Booting standalone BACKUP from a tape cartridge takes between 25 and 75 minutes.

- 5 The procedure asks you for the date and time. Enter the date and time using the 24-hour clock format and press Return. For example:

```
PLEASE ENTER DATE AND TIME (DD-MMM-YYY HH:MM) 05-JUL-1990 13:00
```

- 6 The procedure displays a list of the devices on your system. For example:

```
Available device DKA0:    device type RZ55
Available device MUA0:    device type TK70
.
```

Check the list of devices. If the list is incomplete, make sure that all the drives are connected properly to the system. See your hardware manuals for details.

- 7 When standalone BACKUP finishes booting, it displays an identification message followed by the dollar sign prompt (\$):

```
%BACKUP-I-IDENT, stand-alone BACKUP V5.4; the date is 05-JUL-1990 13:00
$
```

- 8 Remove the tape cartridge containing standalone BACKUP from the tape cartridge drive.

To back up the system disk, go to Section 4.6.

To restore the system disk, go to Section 4.7.

4.6 Backing Up the System Disk

It is especially important that you understand the following functions of the /IMAGE and /PHYSICAL qualifiers to the BACKUP command before using standalone BACKUP.

Qualifier	Function
/IMAGE	Lets you create a functionally equivalent copy of the entire system disk
/PHYSICAL	Copies, saves, restores, or compares the entire system disk in terms of logical blocks, ignoring any file structure

For a complete description of the Backup Utility and its qualifiers, see the *VMS Backup Utility Manual*.

To back up the system disk, use the following procedure:

- 1 Decide whether you want to back up the system to another fixed disk or to a tape cartridge.

Backup Procedures

4.6 Backing Up the System Disk

If you are using a tape cartridge, obtain a scratch tape cartridge that you can use for the backup copy. A scratch tape cartridge is a tape cartridge that is either blank or contains files that you no longer need. Write-enable the tape cartridge and insert it into the tape cartridge drive.

- 2 Write-protect the system disk by pressing the WRITE PROTECT button on the disk drive.
- 3 Boot standalone BACKUP as described in either Section 4.3 or Section 4.5.
- 4 Determine the device names of the drive holding the system disk and the drive holding the backup disk or tape cartridge.
- 5 Enter the BACKUP command in one of the following formats. If you are backing up the system disk to a disk, use the first command. If you are backing up the system disk to a tape cartridge, use the second command.

```
$ BACKUP/IMAGE/VERIFY source-drive: target-drive:
```

```
$ BACKUP/IMAGE/VERIFY source-drive: MUA0:saveset.BCK/REWIND/LABEL=volume-label
```

where:

- *source-drive* is the location of the files you want to backup. Use the device name of the drive holding the system disk.
- *target-drive* is the destination. Use the device name of the drive holding the backup disk or tape cartridge.
- *saveset.BCK* is the name of the saveset (the name should reflect the contents of the backup tape and can have up to 17 characters).
- *volume-label* is the volume label of the tape cartridge in the tape cartridge drive. If the tape cartridge has been initialized already, use the same volume label that was assigned by the INITIALIZE command. If the tape cartridge has not been initialized, you can assign a volume label at this time. The volume label can have up to 6 characters.

The following example uses the BACKUP command to make a backup disk. You can use a backup disk as a system disk.

```
$ BACKUP/IMAGE/VERIFY DKA100: DKA200:
```

The following example uses the BACKUP command to make a backup tape cartridge. The contents of a backup tape cartridge have to be restored to a disk before you can use them. For more information, see Section 4.7.

```
$ BACKUP/IMAGE/VERIFY DKA100: MUA0:JUL_05_1990.BCK/REWIND/LABEL=SYSDSK
```

- 6 The procedure displays the following message:

```
%BACKUP-I-STARTVERIFY, starting verification pass
```


Backup Procedures

4.6 Backing Up the System Disk

- 7 If you are backing up the system disk to another disk, go to step 8.

If you are backing up the system disk to a tape cartridge and the contents of the system disk fit on one tape cartridge, remove the backup tape cartridge from the drive. Label the tape COMPLETE SYSTEM BACKUP and include the date. Then go to step 8.

If you are backing up the system disk to tape cartridges and the system disk contains more data than one tape cartridge can store, the procedure displays the following messages:

```
%BACKUP-I-RESUME, Resuming operation on volume 2
%BACKUP-I-READYWRITE, Mount volume 2 on _MUA0: for writing
Enter "YES" when ready:
```

Do the following:

- Remove the backup tape cartridge from the drive.
- Label it COMPLETE SYSTEM BACKUP, number it, and include the date.
- Write-protect the tape cartridge.
- Write-enable another scratch tape cartridge and insert it into the drive.
- When you are ready to continue, type Y and press the Return key. The procedure displays the following message:

```
%BACKUP-I-STARTVERIFY, starting verification pass
```

Each time the procedure displays a mount request, follow steps a through e.

- 8 When the procedure is finished, it displays the following message:

```
%BACKUP-I-PROCDONE, operation completed. Processing finished at 05-JUL-1990 13:00
If you do not want to perform another standalone BACKUP operation,
use the console to halt the system.
```

If you do want to perform another standalone BACKUP operation, ensure the standalone application volume is online and ready. Enter "YES" to continue:

- 9 Press the Halt button. See Figure 1-1 for the location of the Halt button.
- 10 Reboot the system as described in Section 3.1.1.

Store the backup tape cartridge in a safe place.

Note: The BACKUP command creates a system disk that includes a set of volume parameters provided by Digital, including a CLUSTER_SIZE (disk access scheme) that is usually one. (The CLUSTER_SIZE refers to the way files are stored on the disk, not to VAXclusters.) You can change most volume parameters later with the SET VOLUME command. However, to change the CLUSTER_SIZE you must back up the system disk to a disk that has been initialized previously with the CLUSTER_SIZE that you want. To prevent the BACKUP command from reinitializing the target disk, use the /NOINITIALIZE qualifier. For more

Backup Procedures

4.6 Backing Up the System Disk

information about initializing a disk, see the *Guide to Maintaining a VMS System*. For more information on the BACKUP command, see the *VMS Backup Utility Manual*.

4.7 Restoring the System Disk

To restore the system disk, use the following procedure:

- 1 Determine the device names of the drive holding the system disk and the drive holding the backup disk or tape cartridge by entering the SHOW SCSI command at the console-mode prompt (>>>).
- 2 Boot standalone BACKUP as described in Section 4.3 or Section 4.5.
- 3 If you have a backup tape cartridge, make sure it is write-protected. Insert it into the drive.
- 4 Enter the BACKUP command in one of the following formats. If you have a backup disk, use the first command. If you have a backup tape cartridge, use the second command.

```
$ BACKUP/IMAGE/VERIFY source-drive: target-drive:
```

```
$ BACKUP/IMAGE/VERIFY MUA0:saveset.BCK/REWIND target-drive:
```

where:

- *source-drive* is the location of the files you want to restore. Use the device name of the drive holding the backup disk or tape cartridge.
- *saveset.BCK* is the name of the saveset, if you have a backup tape cartridge.
- *target-drive* is the destination. Use the device name of the drive holding the system disk.

The following example uses the BACKUP command to restore the system disk from a backup disk:

```
$ BACKUP/IMAGE/VERIFY DKA100: DKA200:
```

The following example uses the BACKUP command to restore the system disk from a backup tape cartridge:

```
$ BACKUP/IMAGE/VERIFY MUA0:JUL_05_1990.BCK/REWIND DKA100:
```

- 5 The procedure displays the following message:

```
%BACKUP-I-STARTVERIFY, starting verification pass
```

- 6 If you have a backup disk or only one backup tape cartridge, go to step 8.

If you have more than one backup tape cartridge, the procedure displays the following message:

```
%BACKUP-I-RESUME, Resuming operation on volume 2
%BACKUP-I-READYREAD, Mount volume 2 on MUA0: for reading
Enter "YES" when ready.
```

Remove the first backup tape cartridge from the drive. Insert the next backup tape cartridge into the drive, type Y and press the Return key. Each time you receive a mount request, repeat this step.

Backup Procedures

4.7 Restoring the System Disk

- 7 When the procedure is finished, it displays the following message:

%BACKUP-I-PROCDONE, operation completed. Processing finished at 05-JUL-1990 13:00
If you do not want to perform another standalone BACKUP operation,
use the console to halt the system.

If you do want to perform another standalone BACKUP operation,
ensure the standalone application volume is online and ready.
Enter "YES" to continue:

- 8 Press the Halt button. See Figure 1-1 for the location of the Halt button.
- 9 Reboot the system as described in Section 3.1.1.

5. When the process is finished, display the last report message.
6. The next step is to restore the system files. To do this, click on the "System Files" button in the "Backup" window. This will open the "System Files" window, which shows the list of system files to be restored.
7. Select the system files to be restored. In this case, select all the files in the list.
8. Click on the "Restore" button to start the restoration process.

Glossary

- boot or bootstrap:** The process of loading system software into a processor's main memory. This guide uses the term *boot* to refer to this process.
- boot server:** A VAX computer that is part of a local area VAXcluster. The boot server in a local area VAXcluster has a system disk that contains cluster common files; other nodes in the cluster (satellite nodes) can access these files. See also *satellite node*.
- console mode:** In console mode, you control the system through the console subsystem.
- device name:** The name you use to identify a device on the system. A device name indicates the device code, controller designation, and unit number.
- local area VAXcluster:** Consists of a VAX computer that acts as a boot server and a number of low-end VAX computers that act as satellite nodes. Ethernet connects all of the computers. These computers share a single file system.
- local drive:** Any drive that is connected directly to a computer is referred to as a local drive.
- Mass Storage Control Protocol (MSCP):** The protocol used to communicate between a VAX computer and a controller. An MSCP server makes local MASSBUS, UNIBUS, and UDA disks accessible to all the nodes in a VAXcluster environment.
- media:** A generic term that refers to any packaging agent capable of storing computer software. Examples of media are magnetic tapes, floppy diskettes, disk packs, tape cartridges, etc.
- mixed-interconnect VAXcluster:** A computer system consisting of a number of VAX computers. It uses both the computer interconnect (CI) and Ethernet to communicate with other VAX computers in the cluster.
- program mode:** In program mode, you control the system through the VMS operating system.
- satellite node:** A computer that is part of a local area VAXcluster. A satellite node is booted remotely from the system disk of the boot server in the local area VAXcluster. See also *boot server*.
- save set:** The format that the Backup Utility stores files in. The VMS operating system is shipped in this format.
- scratch disk:** A blank disk or a disk with files that you no longer need.

Glossary

spin up/spin down: To spin up means to bring a disk drive up to operating speed. To spin down means to bring it to a gradual stop.

standalone BACKUP: A version of the VMS Backup Utility that runs from memory without the control of the VMS operating system.

standalone system: A computer system with only one VAX computer.

system disk: The disk that contains (or will contain) the VMS operating system. A VMS system disk is set up so that most of the VMS files can be shared by several computers. In addition, each computer has its own directory on the system disk that contains its page, swap, and dump files.

UDA50: An intelligent disk drive controller that supports up to four disk drives on the UNIBUS.

UNIBUS: A medium-speed I/O subsystem. Some of the devices that can be connected to the UNIBUS are UDA50s, RL02 disk drives, and TU81 magnetic tape drives.

VAXcluster environment: A computer system consisting of a number of VAX computers. There are three types of VAXcluster environments: CI-only, local area, and mixed-interconnect.

VAXserver: A VAX computer that functions primarily as the boot server in a local area VAXcluster. It also can serve as the batch computer for the cluster. A VAXserver is licensed for only two users.

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1. The first step in the process of the development of the new product is the identification of the market need. This is done by conducting a market survey and analyzing the results.

2. The second step is the design of the product. This involves creating a detailed specification of the product and its components. The design must be feasible and meet the market need.

V

T

3. The third step is the production of the product. This involves manufacturing the product according to the design specifications. The production process must be efficient and cost-effective.

4. The fourth step is the distribution of the product. This involves getting the product into the hands of the customer. The distribution channel must be chosen carefully to ensure that the product reaches the target market.

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